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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,612	12/31/2003	Charles Steven Korman	147028-1	8521
6147 7590 04/18/2007 GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			EXAMINER HALL, ASHA J	
			ART UNIT	PAPER NUMBER
			1709	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/18/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/749,612

Applicant(s)

KORMAN ET AL.

Examiner

Asha Hall

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date December 31, 2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Wentworth (3,785,590).

With respect to claims 1-3 and 10-12, Wentworth discloses flexible solar cell/ plurality of solar cell panels (18) assembly for use in an outer space environment/spacecraft or a non-earth environment (col.1; lines: 16-26). It is comprised of a solar cell/solar cell panels (18) having a first side and a second side of the solar cell/ solar cell panels configured to produce an electrical current when receiving photons on at least said first side (col. 1; lines: 26-30). Wentworth further discloses a flexible polymeric substrate, which is a polyimide that is coupled to the second side of the solar cell/solar cell panels (col.2 lines: 62-64).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4,6,8,13, and15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wentworth (3,785,590) in view of Hamakawa et al. (4,773,942).

In regard to claims 4 and 13, Wentworth discloses the flexible substrate of claims 1 and 10 above, but fails to disclose a substrate of thermally non-conductive material. Hamakawa et al. discloses a flexible substrate apart of a photovoltaic cell (col. 2; lines: 63-66), and further discloses a substrate comprised of flexible thermally non-conductive material (12)(col.2; lines: 63-66). Hamakawa et al. also teaches that the substrate is made of insulated heat resistant metal foil such that it does not curl during deposition (col. 1; lines: 63-66). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the flexible thermally non-conductive substrate of Hamakawa et al. as the flexible substrate of the solar cell panels of Wentworth, in order to have a heat resistance substrate that does not curl during deposition.

With respect to claims 6 and 15, Wentworth discloses a flexible solar cell /solar panels (18) of claims 1 and 10 respectively, but fails to disclose a first periphery having a first dimension with a substrate having an aperture extending having a second periphery with a second dimension, meanwhile the first dimension being greater than the second dimension.

Hamakawa et al. discloses a flexible substrate that is apart of a photovoltaic cells (col. 2; lines: 63-66) and further discloses a periphery/perimeter having a first dimension (17) in Figure 5A, with a substrate having an aperture extending/ extending portion (19) electrically connected to a second periphery with a second dimension (18), said first dimension (17) being greater than said second dimension (18) such that they can be

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connected in series and the electrical output can be collected (col.2; lines: 50-55). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the substrate design of Hamakawa et al. to solar cell/ solar panels of Wentworth in order to electrically connect the solar cells in series and collect the electrical output.

With respect to claims 8 and 16, Wentworth has disclosed a solar cell/solar panels (18) along with a flexible substrate (col. 2.; lines: 62-64) to collect solar radiation in claims 1 and 10 respectively, but fails to disclose the thermally conductive layer that extends through to the aperture.

Hamakawa et al. discloses a flexible substrate as apart of a photovoltaic cells (col. 2; lines: 63-66) in Figure1, and further discloses an aperture with an extending portion (5) electrically connect in series (col.2; lines: 50-55), thereby communicating with the thermally conductive layer/electrode (2) which is connected to the solar cell /solar panels (3) (Figure 1) in order to raise/increase the collection of voltage/current (col.1; lines: 50-55). It would have obvious to one of ordinary skill in the art at the time of the invention to add the aperture to the thermally conductive layer/electrode of Hamakawa et al. in the solar panels of Wentworth, in order to receive solar radiation and then convert it into electrical output.

In regard to claim 17, Wentworth discloses a flexible substrate as apart of the photovoltaic cells (col. 2; lines: 62-64) in claim 10 above, but fails to disclose the configuration of electrodes on the photovoltaic conversion/semiconductor layer.

Hamakawa et al. discloses a flexible substrate as apart of the photovoltaic cells (col. 2; lines: 63-66) and further discloses a photovoltaic conversion/semiconductor layer configured to produce an electrical current when receiving photons; and a first electrical contact layer/electrodes electrically coupled to a first side of said photovoltaic conversion layer and a second electrical contact layer/electrodes electrically coupled to a second side of the photovoltaic conversion layer (col. 1; lines 39-49). Hamakawa et al. teaches that in order to raise the voltage of the solar conversion, a plurality of solar cells should be connected in series (col.1; lines: 51-54). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of configuring the electrodes of Hamakawa et al. to the solar cell /solar panels of Wentworth, in order to raise the voltage of the solar radiation conversion.

5. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wentworth (3,785,590) in view of Smith et al. (6,604,521).

With respect to claims 5 and 14, Wentworth has disclosed a flexible solar cell /solar panels (18) to collect solar radiation in claims 1 and 10 above, but fails to disclose a black body.

Smith et al. discloses a solar cell /solar panels that collects solar radiation (col.1; lines: 7-8) and further discloses a thermally conductive layer, wherein the thermally conductive layer communicates with a black body radiating layer extending through a portion of the substrate to receive solar radiation (col. 5; lines: 15-21). It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a

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black coating layer taught by Smith et al. to the solar cell/solar panels of Wentworth in order to receive solar radiation and convert it to electrical power.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wentworth (3,785,590) and Hamakawa et al. (4,773,942) as applied to claim 6 above, and in further view of Smith et al. (6,604,521).

With respect to claim 7, modified Wentworth discloses a solar cell/solar panels (18) along with a flexible substrate (col. 2.; lines: 62-64) to collect solar radiation in the aperture as discussed in claim 6 above, but fails to disclose a black body thermally coupled to the solar cell. Smith et al. discloses a flexible solar cell /solar panels that collects solar radiation (col.1; lines: 7-8) and further discloses a thermally conductive layer communicating with a black body radiating layer (col. 5; lines: 15-21) in order to absorb and reflect the excess radiation. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply a black coating/layer of Smith et al. that communicates with a thermally conductive layer of modified Wentworth in order to receive the solar radiation and convert it into electrical power.

7. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wentworth (3,785,590) in view of Komori et al. (US2001/0054437).

With respect to claims 9 and 18, Wentworth has disclosed a solar cell /solar panels (18) along with a flexible substrate (col. 2.; lines: 62-64) as in claims 1 and 10 above, but fails to disclose a bent substrate.

Komori et al. discloses a substrate for photovoltaic devices (Figure 1b) and further discloses a substrate with a predetermined shape after being bent (Figure 1b) (paragraph 23) in order to provide for a moisture free solar cell module. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply a bent substrate of Komori et al. to the solar cell /solar panels of Wentworth in order to have a moisture free solar cell module.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asha Hall whose telephone number is 571-272-9812. The examiner can normally be reached on Monday-Friday 7:30-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AJH



ALEXA D. NECKEL
SUPERVISORY PATENT EXAMINER